3. Affected Environment

3.1 Introduction

This section describes the existing environmental and socioeconomic conditions that would most likely be affected by the Proposed Action of implementing the NAIS project and serves as a baseline from which to identify and evaluate potential impacts. In compliance with NEPA, CEQ guidelines, and Commandant's Instruction (COMDTINST) M16475.1D, *USCG Implementing Procedures and Policy for Considering Environmental Impacts*, the description of the affected environment focuses on those conditions and resource areas that are potentially subject to impacts. The affected environment is presented in 12 environmental and human resource areas.

This PEIS is a broad program-level planning document that assumes subsequent follow-on, or tiered environmental studies to address future site-specific implementation actions, such as the siting of individual shore-based RF towers. At the program level, it is not possible to provide a detailed comprehensive description of the affected environment for most resource areas because of the broad geographic and temporal scope of the proposed implementation of the NAIS project. Regional discussions of the affected environment, where possible, are provided for some resource categories that are better suited to such discussion at this level. Otherwise, the affected environment for individual resource categories is presented by providing a definition of the resource, followed by a generalized categorization of existing conditions that are likely to be encountered.

A table that provides a listing of regulations, laws, and EOs that can reasonably be expected to apply to the Proposed Action is included in **Appendix C**. This presentation is not intended to be a complete description of the entire legal framework under which the USCG conducts its missions.

3.2 Noise

3.2.1 Definition of Resource

Sound is defined as a particular auditory effect produced by a given source, for example the sound of rain on the roof. Sound is measured with instruments that record instantaneous sound levels in decibels (dB). A-weighted sound level measurements (dBA) are used to characterize sound levels that can be sensed by the human ear. "A-weighted" denotes the adjustment of the frequency content of a sound-producing event to represent the way in which the average human ear responds to the audible event. All sound levels presented in this PEIS are A-weighted.

Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory effect. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. It can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. How an individual responds to the sound source will determine if the sound is viewed as music to ones ears or an annoying noise. Affected receptors are specific (e.g., schools, churches, or hospitals) or broad areas (e.g., nature preserves or designated districts) in which occasional or persistent sensitivity to noise above ambient levels exists.

3.2.2 Existing Conditions

Ambient Sound Levels. Most people are exposed to sound levels of 50 to 55 dBA or higher on a daily basis. Noise levels in residential areas vary depending on the housing density and location. As shown in **Table 3-1**, typical outdoor noise levels in a normal suburban residential area are about 55 dBA, which increases to 60 dBA for an urban residential area, and 80 dBA in the downtown section of a city.

Table 3-1. Typical Outdoor Noise Levels

A-weighted Sound Levels (dBA)	Location
50	Residential area in a small town or quiet suburban area
55	Suburban residential area
60	Urban residential area
65	Noisy urban residential area
70	Very noisy urban residential area
80	City noise (downtown of major metropolitan area)

Source: FHWA 1980

The existing noise conditions for the affected environment is not described in detail because of the broad geographic scope of the project and because specific site locations have not been determined. Published Federal, state, and local laws, ordinances, regulations, and standards can be obtained for comparison with anticipated noise levels. Construction sound levels are discussed below.

Construction Sound Levels. Operation of equipment used for building construction, modification, and demolition work can generate sound levels that exceed ambient sound levels. A variety of sounds can come from trucks, graders, pavers, welders, and other construction processes. **Table 3-2** lists noise levels associated with common types of construction equipment. Operation of construction equipment usually exceeds the ambient sound levels by 20 to 25 dBA in an urban environment and up to 30 to 35 dBA in a quiet suburban area.

3.3 Air Quality

3.3.1 Definition of the Resource

In accordance with Federal Clean Air Act (CAA) requirements (42 United States Code [U.S.C.] 7401–7671q, as amended) the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million (ppm), milligrams per cubic meter (mg/m^3), or micrograms per cubic meter ($\mu g/m^3$). The air quality in a region is a result not only of the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological "air basin," and the prevailing meteorological conditions.

Table 3-2. Predicted Sound Levels for Construction Equipment

Construction Category and Equipment	Predicted A-weighted Sound Levels at 50 feet (dBA)
Grading	
Bulldozer	87
Grader	85
Water Truck	88
Paving	
Paver	89
Roller	74
Demolition	
Loader	85
Haul Truck	88
Building Construction	
Generator Saw	81
Industrial Saw	83
Welder	74
Truck	80
Forklift	67
Crane	83

Source: COL 2001

The CAA directed the U.S. Environmental Protection Agency (USEPA) to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to impact human health and the environment. USEPA established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulate matter equal to or less than 10 microns in diameter [PM_{10}] and particulate matter equal to or less than 2.5 microns in diameter [$PM_{2.5}$]), and lead (Pb). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources along with maintaining visibility standards. **Table 3-3** presents the primary and secondary NAAQS (USEPA 2004a).

Although O_3 is considered a criteria air pollutant and is measurable in the atmosphere, it is not often considered a regulated air pollutant when calculating emissions because O_3 is typically not emitted directly from most emissions sources. Ozone is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants or "O_3 precursors." These O_3 precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies attempt to limit atmospheric O_3 concentrations by controlling VOC pollutants (also identified as reactive organic gases) and NO_2.

Table 3-3. National Ambient Air Quality Standards

Pollutant	Standard Value		Standard Type
CO			
8-hour Average[1]	9 ppm	(10 mg/m^3)	Primary and Secondary
1-hour Average[1]	35 ppm	(40 mg/m^3)	Primary
NO_2			
Annual Arithmetic Mean	0.053 ppm	(100 µg/m^3)	Primary and Secondary
O_3			
8-hour Average[2]	0.08 ppm	(157 µg/m^3)	Primary and Secondary
Pb			
Quarterly Average		1.5 µg/m^3	Primary and Secondary
PM_{10}			
Annual Arithmetic Mean[3]		50 µg/m^3	Primary and Secondary
24-hour Average[1]		150 µg/m^3	Primary and Secondary
$PM_{2.5}$			
Annual Arithmetic Mean[4]		15 µg/m^3	Primary and Secondary
24-hour Average[6]		65 µg/m^3	Primary and Secondary
SO_2			
Annual Arithmetic Mean	0.03 ppm	(80 µg/m^3)	Primary
24-hour Average[1]	0.14 ppm	(365 µg/m^3)	Primary
3-hour Average[1]	0.5 ppm	(1,300 µg/m^3)	Secondary

Source: USEPA 2004a

Notes: Parenthetical values are approximate equivalent concentrations.

[1] Not to be exceeded more than once per year.

[2] To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

[3] To attain this standard, the expected annual arithmetic mean PM_{10} concentration at each monitor within an area must not exceed 50 µg/m^3.

[4] To attain this standard, the 3-year average of the annual arithmetic mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.

[5] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 µg/m^3.

As authorized by the CAA, USEPA has delegated responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. These programs are detailed in State Implementation Plans (SIPs) that must be developed by each state or local regulatory agency and approved by USEPA. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by USEPA.

In 1997, USEPA initiated work on new General Conformity rules and guidance to reflect the new 8-hour O_3, $PM_{2.5}$, and regional haze standards that were promulgated in that year. The 1-hour O_3 standard will no longer apply to an area 1 year after the effective date of the designation of that area for the 8-hour O_3 NAAQS. USEPA designated $PM_{2.5}$ nonattainment areas in December 2004.

The General Conformity Rule and the promulgated regulations found in 40 CFR Part 93 exempt certain Federal actions from conformity determinations (e.g., contaminated site cleanup and natural emergency response activities). Other Federal actions are assumed to conform if total indirect and direct project emissions are below *de minimis* levels presented in 40 CFR 93.153. The threshold levels (in tons of pollutant per year) depend upon the nonattainment status that USEPA has assigned to a nonattainment area. Once the net change in nonattainment pollutants is calculated, the Federal agency must compare them to the *de minimis* thresholds.

Title V of the CAA Amendments of 1990 requires states and local agencies to permit major stationary sources. A major stationary source is a facility (i.e., plant, base, or activity) that has the potential to emit more than 100 tons per year (tpy) of any one criteria air pollutant, 10 tpy of a hazardous air pollutant, or 25 tpy of any combination of hazardous air pollutants. However, lower pollutant-specific "major source" permitting thresholds apply in nonattainment areas. For example, the Title V permitting threshold for an "extreme" O_3 nonattainment area is 10 tpy of potential VOC or NO_x emissions. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality. Synthetic minor sources are those facilities that would be regulated under the air operating permit program but have opted to keep their emissions limits lower than the threshold for the program.

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be "significant" if (1) a proposed project is within 10 kilometers of any Class I area, and (2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more [40 CFR 52.21(b)(23)(iii)]. PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III [40 CFR 52.21(c)].

3.3.2 Existing Conditions

It is not possible to describe in detail the entire affected environment of the broad geographic scope for air quality as assessed in this PEIS. Site-specific air quality will be addressed in follow-on NEPA documentation, as necessary, during the siting of NAIS shore-based RF equipment as the USCG determines where such equipment would be located. A discussion of how air quality would be considered in siting NAIS shore-based RF equipment follows.

Since the exact location of each site is not known at this time, the site could be constructed within either an attainment or nonattainment area or within the vicinity of a Class I area. Each site-specific NEPA analysis would determine whether a chosen shore-based RF site is in compliance with General Conformity, Title V, and PSD requirements. This determination would be based on USEPA air quality standards and coordinated with each site's state and regional air pollution control agencies and air quality management district offices. However, based on emissions using the assumptions discussed in **Section 2**, construction and operation of individual NAIS sites would be well below criteria pollutant emissions thresholds and would be well below 10 percent of an area's total emissions for each pollutant. For each chosen shore-based RF site location, the USCG would coordinate with the appropriate air quality control region to determine whether an air quality permit is required for the backup generator.

3.4 Earth Resources

3.4.1 Definition of the Resource

Earth resources are defined as the geology, soils, and topography that characterize an area. Geological resources consist of the surface and near-surface materials of the earth and the regional or local forces by which they have formed. These resources are typically described in terms of regional and local geology, mineral or paleontological resources (if applicable), and geologic hazards. Regional and local geologic resources comprise earth materials within a specified region and the forces that have shaped them. These include bedrock or sediment type and structure, unique geologic features, depositional or erosional environment, and age or history. Mineral and paleontological resources include usable geological materials that have some economic or academic value. Soil resources include the unconsolidated, terrestrial materials overlying the bedrock or parent material and are typically described in terms of their complex type, slope, and physical characteristics (i.e., strength, expansion potential, cohesion, and grain size). Topography consists of the geomorphic characteristics of the land or sea floor surface, including the change in vertical elevation of the earth's surface across a given area, relationship with adjacent land features, and geographic location.

Prime farmland is protected under the Farmland Protection Policy Act of 1981. The intent of the Act is to minimize the extent to which Federal programs contribute to the unnecessary or irreversible conversion of farmland to nonagricultural uses. The Act also ensures that Federal programs are administered in a manner that, to the extent practicable, will be compatible with private, state, and local government programs and policies to protect farmland. The Natural Resources Conservation Service (NRCS) is responsible for overseeing compliance with the Act and has developed the rules and regulations for implementation of the Act. The implementing procedures of the Farmland Protection Policy Act and NRCS programs require Federal agencies to evaluate the adverse effects (direct and indirect) of their activities on prime and unique farmland, as well as farmland of statewide and local importance, and to consider alternative actions that could avoid adverse effects. Determination of whether an area is considered prime or unique farmland and potential impacts associated with a proposed action are based on preparation of the farmland conversion impact rating form AD-1006 for areas where prime farmland soils occur and by applying criteria established at Section 658.5 of the Farmland Protection Policy Act (7 CFR 658, July 5, 1984).

Implementation of erosion and sediment controls and storm water best management practices during and following construction activities are typically required by state or local ordinances. Requirements vary by state and in some cases, by municipality. Specific requirements applicable to the NAIS project would be determined on a site-specific basis once the locations of proposed NAIS towers are determined. The USCG also has established storm water management guidelines in the *Draft Phase II Stormwater Management Guide* (Commandant Publication [COMDTPUB] 11300.3). The guide applies to construction disturbances between 1 and 5 acres. Section 402 of the Clean Water Act (CWA) also addresses storm water runoff from construction sites and requires Phase II National Pollutant Discharge Elimination System (NPDES) permits for disturbances between 1 and 5 acres, and Phase I permits for disturbances of more than 5 acres. **Section 3.5** (Water Resources) provides a more detailed discussion of Section 402 requirements.

3.4.2 Existing Conditions

Earth resources and associated features are not described in detail in this PEIS because of the broad geographic scope of the project and because specific site locations have not been determined. Geologic characteristics and potential uses and limitations associated with the resource will vary depending on

geographic location. Limitations associated with geology might include shallow rock, structural instability, or geologic hazards. Geologic hazards comprise the regional or local forces or conditions that could affect a proposed development or land use (e.g., seismicity, slope stability, and subsidence or solution weathering). The characteristics of soils that develop in an area are the result of the geology, parent material, landscape position, climate, and age of the soil. Site-specific characterization is necessary to determine potential uses and limitations associated with soils. Examples of soil characteristics that can limit use include poor drainage, excessive wetness, excessive erodibility, the presence of shrink-swell clays, or the occurrence of prime farmland. Soil characteristics can preclude proposed uses, require the application of special engineering designs, or require coordination with Federal or state agencies. Topographic characteristics might limit use as a result of steep slopes and instability.

Site-specific characteristics associated with geology, soils, and topography will be addressed in follow-on NEPA documentation, as necessary, during the siting of NAIS shore-based RF equipment as the USCG determines where such equipment would be located.

3.5 Water Resources

3.5.1 Definition of the Resource

Water resources include surface water, groundwater, and floodplains. The quantity and quality of available water and the demand for potable, agricultural, and industrial water affect its value. The following discusses Federal laws pertinent to protecting the quality and use of water resources. The term "waters of the United States" includes interstate and intrastate lakes, rivers, streams, and wetlands that are used for commerce, recreation, industry, sources of fish, and other purposes. Wetland resources are discussed in Section 3.6.

The CWA of 1977 is an amendment to the Federal Water Pollution Control Act of 1948 and Amendments (1972) (33 U.S.C. 1251–1387). The CWA, administered by USEPA, uses both water quality standards and technology-based effluent limitations to protect and restore water quality. Technology-based effluent limitations are specific numerical limitations placed on certain pollutants from certain sources and applied to industrial and municipal sources. Water quality standards consist of a designated beneficial use of a waterbody (e.g., contact recreation, fishing, water supply), and the numerical or quantitative statement that identifies at what point the waterbody does not meet its designated use.

The CWA requires states to establish water quality standards for waterbodies inside their borders and then identify waters not meeting the standards. USEPA has delegated permitting responsibilities to qualified states under Sections 401 and 402 of the CWA. Section 401 requires a permit for any activity (including construction and operation of facilities) that can result in any discharge into navigable waters. Section 402 authorizes the NPDES permitting program to regulate and enforce discharges into U.S. waters. The NPDES permitting program targets point-source outfalls associated with industrial wastewater and municipal sewage discharges. Storm water runoff is also regulated under NPDES to include storm water discharges from large construction projects, usually larger than 1 acre in size. USEPA administers NPDES permits for five states (Alaska, Idaho, Massachusetts, New Hampshire, and New Mexico), the District of Columbia, and U.S. territories (except the Virgin Islands), while the remaining 45 states and the Virgin Islands have partial or full State Pollutant Discharge Elimination System (SPDES) permitting authority (USEPA 2003). Section 404 of the CWA establishes a Federal program to regulate the discharge of dredge and fill material into waters of the United States. Section 404 permits are issued by the U.S. Army Corps of Engineers (USACE), subject to and using USEPA's environmental guidance. USEPA has authorized two states (Michigan and New Jersey) certain Section 404 permitting responsibilities (Copeland 2002). Applicability of Section 401 and 404 permitting to wetlands is discussed in **Section 3.6**.

The Wild and Scenic Rivers Act (WSRA) of 1968 (16 U.S.C. 1271–1287), administered by the DOI, provides for a wild and scenic river system by recognizing the remarkable values (scenic, recreational, geologic, fish and wildlife, historic, cultural, or other values) of specific rivers of the United States. The policy not only protects the water quality of the selected rivers but also provides for the enjoyment of present and future generations. Any river in a free-flowing condition is eligible for inclusion, and can be authorized as such by Congress, a state legislature, or by the Secretary of the Interior upon the recommendation of the governor of the state(s) through which the river flows. Under the WSRA, Federal agencies are required to consider the potential national wild, scenic, and recreational river areas for the use and development of water and related land resources.

The Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. 1451 et seq) declares a national policy to preserve, protect, develop, and, where possible, restore or enhance the resources of the nation's coastal zone. Applicability of the CZMA to land use is discussed in **Section 3.10**.

The Safe Drinking Water Act (SDWA) was originally passed in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources (i.e., rivers, lakes, reservoirs, springs, and groundwater wells). The Sole Source Aquifer Protection Program is authorized under Section 1424(e) of the SDWA. A sole source aquifer is defined as supplying at least 50 percent of the drinking water consumed in an area overlying the aquifer. There are 73 designated sole source aquifers in the United States and U.S. territories (USEPA 2006). Any federally funded proposed project (including those that are partially federally funded) with the potential to contaminate a designated sole source aquifer is subject to USEPA review.

EO 11988, *Floodplain Management* (May 24, 1977), requires Federal agencies to determine whether a proposed action would occur within a floodplain and consider alternatives to avoid adverse effects and incompatible development in floodplains. EO 11988 directs Federal agencies to avoid floodplains unless the agency determines that there is no practicable alternative. The Federal Emergency Management Agency (FEMA) oversees and regulates floodplain management. Regulatory floodplains are delineated in FEMA Flood Insurance Rate Maps.

3.5.2 Existing Conditions

Surface Water. For the purposes of this PEIS, surface water categories are divided into freshwater streams and rivers, freshwater lakes and reservoirs, and estuaries. USEPA has identified beneficial uses for surface water under the CWA, including aquatic life support, fish consumption, shellfish harvesting, drinking water supply, primary contact recreation, secondary contact recreation, and agriculture. States set their own water quality standards to accomplish these beneficial uses.

Freshwater Streams and Rivers. Freshwater streams and rivers are the dynamic interconnected systems of moving water. Streams can be perennial (flow year-round), intermittent (flow during storm events or snowmelt), or interrupted (perennial flows that goes underground in karst terrain). Without human interferences, stream and river courses "meander" over time in response to natural occurrences that alter the landscape (e.g., landslides, tropical typhoons, earthquakes). Humans frequently modify stream channels to develop land, protect existing infrastructure, or supply potable water.

Smaller streams join together to form larger streams, and the coming together of streams eventually form rivers. Ultimately, rivers flow into lakes or estuaries. The interconnected system of moving waterbodies is a watershed. Watersheds are defined by the highest elevations that divide two drainage basins (called drainage divides), but watersheds can be discussed on small, local scales (e.g., New River Watershed in

Virginia) or large scales (e.g., Mississippi River Watershed). One watershed can be composed of many subwatersheds.

Freshwater Lakes and Reservoirs. Lakes are bodies of relatively still water, which can be formed from many processes, including glaciation, tectonic movements, volcanic activity, and rivers. Reservoirs are rivers that have been dammed for human uses (e.g., water supply, power generation, recreation). The water in lakes can be supplied by streams and rivers, groundwater, or melting glaciers.

Estuaries and Shorelines. Estuaries (including bays and tidal rivers) are bodies of water that provide transition zones between fresh river water and saline ocean water. This interaction produces an environment suited to unique wildlife and fisheries and contributes substantially to the U.S. economy. Critical coastal habitats, such as estuaries, provide spawning grounds, nurseries, shelter, and food for finfish, shellfish, birds, and other wildlife (USEPA 2004b). Ocean shorelines provide habitat for fish, shellfish, and other animals, and support recreational activities.

Surface Water Quality. Water quality is evaluated by direct measurement of factors that are considered important to the health of the ecosystem and the existing or intended water use. Baseline water quality constituents include temperature, total dissolved solids (salinity and hardness), dissolved oxygen, nutrients, pH, suspended solids (turbidity), and other contaminants. Trace constituents such as metals and organic compounds, as well as pathogens, also affect water quality.

Based on USEPA's *The Quality of Our Nation's Waters* (2000a), types of pollutants vary nationwide, but the principal pollutants causing water impairments include nutrients, siltation, metals, and pathogens, all of which contribute to low levels of dissolved oxygen and other impairments. Major sources of pollutants include agriculture runoff, hydromodification, storm water runoff, municipal point sources, atmospheric deposition, and chemical leaks or discharges (USEPA 2000a). The Proposed Action as set forth in **Section 2** has the potential to generate pollutants from storm water runoff and chemical leaks or discharges, so these potential sources are discussed in more detail.

Storm water runoff is a widespread problem affecting surface water quantity and quality. Storm water in rural areas is largely absorbed by grass, trees, and soil where drainage features have not been extensively modified. However, urban areas have considerably more impervious surface (which increases flash flooding). For instance, a large, sudden flow could scour a streambed and harm biological resources, or threaten human safety and infrastructure downstream. Engineered storm water systems convey precipitation away from developed sites to receiving surface waters. Appropriately designed storm water management systems employ a variety of devices to slow the movement of water.

Storm water also carries a multitude of pollutants that it picks up while flowing over land. In rural areas, pollutants can include nutrients and sediment from agriculture and livestock operations, which can result in algal blooms and fish kills in lakes or estuaries. In urban areas, pollutants include nutrients, sediments, petroleum, and other organic and inorganic chemicals.

Storm water runoff is generally considered a nonpoint source pollutant. However, it can be quantified as a point source when buildings or municipalities (including USCG Stations, Air Stations, or Integrated Support Commands) have storm water systems that collect, convey, and discharge at an outfall into waters of the United States. Facilities and municipalities with storm systems and construction sites are required to obtain an NPDES permit under the CWA. The USCG has Storm Water Management Guides for both Phase I and Phase II NPDES permits (COMDTPUB 11300.3 Phase I and Phase II). NPDES storm water permits are not intended to cover individual Federal buildings (unless a state determines that it requires a NPDES permit). Construction projects would require a NPDES construction permit if the

area disturbed is greater than 1 acre (would require Phase II permit) or 5 acres (would require Phase I permit).

Chemical leaks or discharges can have long-lasting effects on a surface waterbody. Chemical leaks could include a variety of organic and inorganic compounds. Common sources of these sorts of compounds include fuel spills, or leaking storage tanks. Most pipes and other discharges into waterbodies are regulated under the CWA. As described above, organic and inorganic compounds can have long-lasting effects when metals or toxic chemicals contaminate a waterbody, resulting in human health hazards and fish kills.

Groundwater. Groundwater is the subsurface water that fully saturates pores or cracks in soils and rock. It replenishes streams, rivers, and habitats and provides fresh water for irrigation, industry, and potable water consumption.

Groundwater Systems. An aquifer is the geologic layer that transmits groundwater. Aquifers can be unconfined (no layer to restrict the vertical movement of groundwater) or confined (bounded by clays or nonporous bedrock). Aquifers can comprise unconsolidated, semiconsolidated, or consolidated materials. They can be further discussed in terms of origin, thickness, or hydraulic conductivity (the rate at which water can transmit though an aquifer). These characteristics are inherently dependent on regional and local geology.

Principal aquifers by material include sand and gravel and sandstone, carbonate, and igneous and metamorphic rock (or sometimes two adjoining rock types). Other rock types that are not considered "principal" or major aquifers are also important constituents of groundwater systems. Sand and gravel aquifers, which are typically unconfined, are composed of unconsolidated and semiconsolidated materials. Water is held between the particles of sand and gravel, so hydraulic conductivity is usually rapid. Sandstone and igneous and metamorphic (volcanic) rock are inherently nonporous and do not transmit water; however, fractures and faulting within these rocks can create highly productive aquifers. The most common kind of carbonate rock is limestone, which originates from a sedimentary deposit from a marine environment. Carbonate aquifers are unique because limestone becomes dissolutioned in contact with water over time and creates open cavities. Solution cavities can be small tubular cracks to large interconnected caverns. Karst topography refers to the areas where carbonate rocks are exposed at the surface of the land; karst regions are highly susceptible to groundwater contamination because water moves rapidly through the dissolutioned rock. Other rocks can comprise a minor aquifer or confining bed (USGS 2005).

Groundwater Quality. Water quality parameters and sources of contamination discussed under *Surface Water* are also applicable to groundwater. It is estimated that, on average, streams receive 52 percent of their base flow from groundwater, so the same factors that affect surface water affect groundwater, and vice versa (USEPA 2000b). Most aquifers are more protected than surface water from quick contamination because as water migrates down through soil and rock layers, many chemicals and solid particles become somewhat "filtered" before entering an aquifer by forming attractive bonds with soil particles. Confining units (clay or nonporous rock) also act as barriers to pollution for confined aquifers, whereas unconfined aquifers in urban or industrial areas are commonly contaminated with various pollutants. For example, a small fuel spill would be more likely to adversely affect a surface waterbody or shallow, unconfined aquifer than a deep, regional, confined aquifer. The potential of a contaminant to affect groundwater quality is dependent on its ability to migrate through the overlying soils to the underlying groundwater resource (USEPA 2000b).

Some confined aquifers, such as carbonate aquifers, are inherently more susceptible to contamination because they consist of open channels that allow water to move quickly and unimpeded. Chronic

pollution could also eventually contaminate an aquifer. For example, petroleum from a chronic leaking underground storage tank will likely eventually migrate some distance into the soil and then groundwater, though the extent of the contamination (referred to as the plume) would depend on both the rate at which the substance leaks over time and the composition of the geologic material. Contamination can also occur as gradual deterioration of groundwater quality over a large area of land as a result of nonpoint sources of pollution (e.g., fertilizers, pesticides).

Floodplains. Natural flooding by streams is the most common type of flooding. This type of flooding occurs when heavy rain or snowmelt results in water overflowing the normal stream channel and into the floodplain. Marine coasts also experience flooding from wind-driven storm surges and excessive rain from tropical cyclones (i.e., typhoons and hurricanes). Large inland lakes can also flood the surrounding area. The risk of flooding typically hinges on local topography, the frequency of precipitation events, and the size of the watershed above the floodplain.

FEMA delineates the floodplain for 100-year and 500-year flood events. The 100-year floodplain is the area that has a 1 percent chance of inundation by a flood event in a given year. The 500-year floodplain is the area that has a 0.2 percent change on inundation in a given year. The probability of a flood event is not equivalent to the frequency at which a 100- or 500-year flood event will actually occur in a given locality. Water flow is dependent on many factors in a watershed and can change from year to year. The frequency and magnitude of large flood events changes over time and with development, for example, as upstream channels are altered, or as overall impervious surfaces increase in the watershed.

Certain facilities inherently pose too great a risk to be in either the 100- or 500-year floodplain, such as hospitals, schools, or storage buildings for irreplaceable records. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to human health and safety. Federal agencies are prohibited from developing in the 100-year floodplain unless the appropriate agency official can demonstrate that there is no practicable alternative in accordance with EO 11988.

3.6 Biological Resources

3.6.1 Definition of the Resource

Biological resources include native or naturalized vegetation and wildlife, and the habitats, such as forests, grasslands, wetlands, or aquatic resources in which they exist. Sensitive and protected biological resources include plant and animal species listed as threatened or endangered by the United States Fish and Wildlife Service (USFWS) or a state.

Categories of biological resources evaluated in this PEIS include vegetation and associated habitats, wildlife, threatened and endangered species, and wetlands. Biological resources of particular concern in this assessment, in addition to threatened and endangered species, include neotropical migratory birds, due to the potential for impacts associated with tower structures. Wetlands are evaluated as a distinct habitat category because they are important natural systems that can provide diverse biologic and hydrologic functions such as water quality improvement, groundwater recharge and discharge, wildlife habitat provision, unique flora and fauna niche provision, pollution mitigation, nutrient cycling, storm water attenuation and storage, sediment detention, and erosion protection.

Biological resources are protected through Federal and state laws, regulations, programs, and EOs. Proposed activities must comply with criteria and requirements of regulations applicable to the potentially affected resources. The following text provides a summary of the Federal regulatory framework applicable to biological resources potentially affected by the alternatives evaluated in this assessment.

State regulatory criteria applicable to biological resources, such the protection of state-listed sensitive species or habitats, or state level protection of wetlands, would be addressed during site-specific tiered analysis of considered alternatives.

The Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.) mandates that all Federal agencies consider the potential effects of their actions on species listed as threatened or endangered. Under the ESA, an endangered species is defined as any species in danger of extinction throughout all or a significant area of its range. A threatened species is defined as any species likely to become endangered in the foreseeable future. Under the act, the USFWS and the NMFS are responsible for compiling the lists of threatened and endangered species. Section 7 (a)(1) of the ESA requires Federal agencies to use their operating authorities to carry out conservation programs for listed species. Section 7 (a)(2) also requires Federal agencies to ensure that all federally associated activities within the United States or its territories do not have adverse impacts on the continued existence of threatened or endangered species or on habitats that are important in conserving those species. Section 7 (a)(4) of the ESA requires Federal agencies to confer with the USFWS or NMFS on any agency action which is likely to jeopardize the continued existence of any listed species (including plant species), or result in the destruction or adverse modification of designated critical habitat. If an agency determines that an action might adversely affect a federally listed species or its designated critical habitat, then preparation of a Biological Assessment is required. Formal consultation is initiated once the Biological Assessment is submitted to USFWS or NMFS. The USFWS or NMFS will prepare a Biological Opinion stating whether the action is likely to jeopardize the continued existence of a listed species or cause the destruction or adverse modification of critical habitat. The purpose of the process is to ensure avoidance and minimization of potential adverse impacts on a listed species, or its designated critical habitat.

The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the United States. Section 404 of the act regulates dredging and the placement of fill into waters of the United States, including wetlands. A permit is required from the USACE before conducting projects that will result in dredging or the placement of fill into wetlands or other waters of the United States. Permits for dredge or fill activities also require compliance with other applicable state and Federal regulations. Section 401 of the CWA provides authority for states to require that a water quality certification be obtained prior to issuance of a Section 404 permit. Section 402 of the CWA provides additional protection to surface water and aquatic biological resources from impacts associated with storm water runoff by requiring obtainment of a NPDES for various land development activities.

EO 11990, *Protection of Wetlands*, directs Federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands, and to avoid direct or indirect support of new construction in wetlands whenever there is a practicable alternative.

The Fish and Wildlife Conservation Act (16 U.S.C. 2901–2911; 94 Stat. 1322) authorizes financial and technical assistance to the states for the development, revision, and implementation of conservation plans and programs for nongame fish and wildlife. Federally sponsored projects are required to be in compliance with the provisions of developed conservation plans and programs.

The Migratory Bird Treaty Act (MBTA) of 1918, as amended, establishes that all migratory birds and their parts (including eggs, nests, and feathers) are fully protected. The act establishes a prohibition, unless permitted by regulations, to pursue, hunt, take, capture, or kill; attempt to take, capture, or kill; possess; offer for sale; sell; offer to purchase; purchase; deliver for shipment; ship; cause to be shipped; deliver for transportation; transport; cause to be transported; carry; or cause to be carried by any means whatever; receive for shipment, transportation, or carriage; or export, at any time, or in any manner, any migratory bird; or any part, nest, or egg of any such bird. The act also provides the Secretary of the Interior with authority to determine when any of the prohibited actions could be undertaken, and to adopt

regulations for this purpose. Resident birds that do not migrate, such as quail, turkey, and pheasant, are managed solely through state fish and wildlife agencies, and are not protected under the MBTA (USFWS 2005).

The National Wildlife Refuge System Improvement Act of 1997 (Public Law [P.L.] 105–57) was passed to ensure that the Refuge System is managed as a national system of related lands, waters, and interests for the protection and conservation of the nation's wildlife resources. The National Wildlife Refuge System is the only network of Federal lands devoted specifically to wildlife and includes more than 500 refuges and thousands of waterfowl production areas across the United States. Many of the refuges are near the coast and provide habitat for migratory birds during their seasonal migrations. Activities that can affect the biological resources in a refuge must comply with a Special Use Permit based on a compatibility determination from the USFWS.

The Federal Communication Commission (FCC) regulations established at Title 47, Chapter 1, Part 47, requires the Federal Aviation Administration (FAA) to conduct an aeronautical study of the navigation air space (which begins at 200 feet and extends to 60,000 feet above the ground) to determine appropriate tower marking and lighting requirements to achieve safe air space when a tower is proposed for FCC registration. The FAA can vary marking and lighting recommendations when requested, provided that aviation safety is not compromised. For example, the FAA can recommend using red lights and painting instead of high-intensity white strobe lighting when a tower is located near a residential community. In all cases, safe aviation conditions around the tower are the FCC's primary concern and direct the marking and lighting requirements. Navigation air space, which starts at 200 feet above the ground, decreases in elevation in close proximity to airports, so the minimum height for required marking or lighting would decrease in these areas.

The USFWS, Office of Migratory Bird Management, which is the lead division for protection of migratory birds at the Federal level, established the Communication Tower Working Group. The purpose of the group, which is composed of government, industry, and academic groups, is to study and determine tower construction approaches that prevent bird strikes.

There are several independent migratory bird and habitat protection groups and programs that focus on the preservation of migratory birds and their habitats. Most of the programs work together and usually involve state and Federal agencies with similar research and protection goals. The following text provides a summary of the primary programs and their goals:

Partners in Flight (PIF) is an international coalition of volunteer government, academic, conservation, and private industry agencies dedicated to preserving avian species. The group primarily focuses on maintaining populations of common bird species. The Audubon Society, Nature Conservancy, and USFWS are members of the coalition. The group developed Bird Conservation Plans for each of the physiographic regions of the United States. Each Bird Conservation Plan is part of the overall Landbird Conservation Strategy developed by PIF (URS 2004).

The Audubon Society operates the Important Bird Areas Program, which evaluates and categorizes geographic locations based on their importance for supporting significant bird populations during breeding, wintering, or migration seasons. The Audubon Society also maintains the PIF Watchlist, which monitors common avian species to determine population fluxes and management needs (URS 2004).

The American Bird Conservancy is dedicated to the conservation of birds and their habitats and conducts studies relating to birds, including avian deaths at towers. The American Bird Conservancy is a partner in PIF and the Communication Tower Working Group (URS 2004).

EO 13186, *Responsibility of Federal Agencies to Protect Migratory Birds*, requires each Federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations to develop and implement a Memorandum of Understanding (MOU) with the USFWS to promote the conservation of migratory bird populations.

3.6.2 Existing Conditions

Vegetation. Vegetation and associated habitats are not described in detail because of the broad geographic scope of the project and because specific site locations have not been determined. Site-specific characterization of vegetation and associated habitats will be addressed in follow-on NEPA documentation, as necessary, during the siting of NAIS shore-based RF equipment as the USCG determines where such equipment would be located.

Vegetation potentially affected by the NAIS project would vary by location. A variety of plant communities are associated with coastal, riverine, and aquatic habitats. There are several habitat characteristics and associated plant communities that are unique to coastal areas, some of which include sand dune and interdunal habitats, rocky intertidal habitats, coastal bluffs, and tidal and nontidal wetlands including mangrove habitats. Examples of vegetative communities and habitats associated with riverine systems include riparian forests, floodplain habitats including bottomland hardwood forests, riverine and palustrine wetlands, and scrub-shrub habitats. Submerged aquatic vegetation might be found in both marine and riverine habitats and emergent wetland vegetation can be found in both marine and freshwater wetland habitats.

Plant communities found in coastal environments and in association with riverine systems are important for wildlife habitat and for stabilizing shorelines and other coastal land forms frequently subjected to erosion. These plant communities are also important in maintaining the water quality of coastal and inland waters.

Wildlife. As with vegetation, it is not possible to describe in detail the species of wildlife or variability in wildlife habitat that might affect the occurrence, type, and abundance of species that could occur in the vicinity of an existing or proposed RF tower. The potential for an area to provide and be used as wildlife habitat is based on several factors including topography, vegetative cover and type, water availability, aerial extent, connectedness, and interferences attributable to human activity. Site-specific characterization of wildlife habitat and associated species will be addressed in follow-on NEPA documentation, if necessary, during the siting of NAIS shore-based RF equipment when the USCG determines where such equipment would be located.

Migratory Birds. There are 836 species of migratory birds that are identified and protected through the MBTA, as amended, or various other laws and acts implemented by the USFWS. Most migratory birds that occur in the United States fly south each fall from rather well-defined breeding grounds to their wintering grounds. Many species winter in habitats throughout the southeast, or farther south in Mexico, Central and South America, and the Caribbean. In the spring they return north to their breeding grounds, where young are produced and the cycle repeats (USFWS 2005).

Fifty-nine of the 836 protected migratory bird species are game birds. These include ducks, geese, swan, various pigeons, woodcock, rails, snipes, gallinules, and some sea birds. There are 777 species (93 percent) considered nongame birds. The nongame birds are represented by groups including marsh and wading birds (6 percent), birds of prey such as hawks, owls, and eagles (9 percent); shorebirds (10 percent); sea birds (16 percent); and perching birds (59 percent). Perching birds include song birds and neotropical migratory birds. Neotropical migratory birds include warblers, vireos, flycatchers,

hummingbirds, swallows, and other birds that migrate to wintering grounds south of the United States, in Mexico, Central and South America, and in the Caribbean (USFWS 2005).

In general, bird migration in the United States is in a north and south direction and is concentrated along major topographic features such as mountain ridges, coastlines, and major rivers. While each species of bird might have their own route, many birds use the same general routes. **Figure 3-1** shows the general locations of major migratory bird flyways in continental North America. These migration routes are grouped into four major flyways that are generally recognized in North America: the Atlantic, the Mississippi, the Central, and the Pacific. Birds typically move along these routes between their breeding grounds in Canada and the northern United States, and their wintering grounds in Central and South America.

The Atlantic coast is a regular avenue of travel for about 50 species of landbirds that breed in New England, then follow the coast southward to Florida and travel from there by island and mainland to South America. From Florida the route passes through the Bahamas, Cuba, Hispaniola, Puerto Rico, and the Lesser Antilles before reaching the South American coast. The route is in sight of land along its entire length. About 25 species of birds go beyond Cuba to Puerto Rico along this route. Only six species are known to travel to South America by way of the Lesser Antilles. Many thousands of American coots and American wigeons, northern pintails, blue-winged teals, other waterfowl, and shorebirds regularly spend the winter season in the coastal wetlands, inland lakes, and ponds of Cuba, Hispaniola, and Puerto Rico (Lincoln et al. 1998).

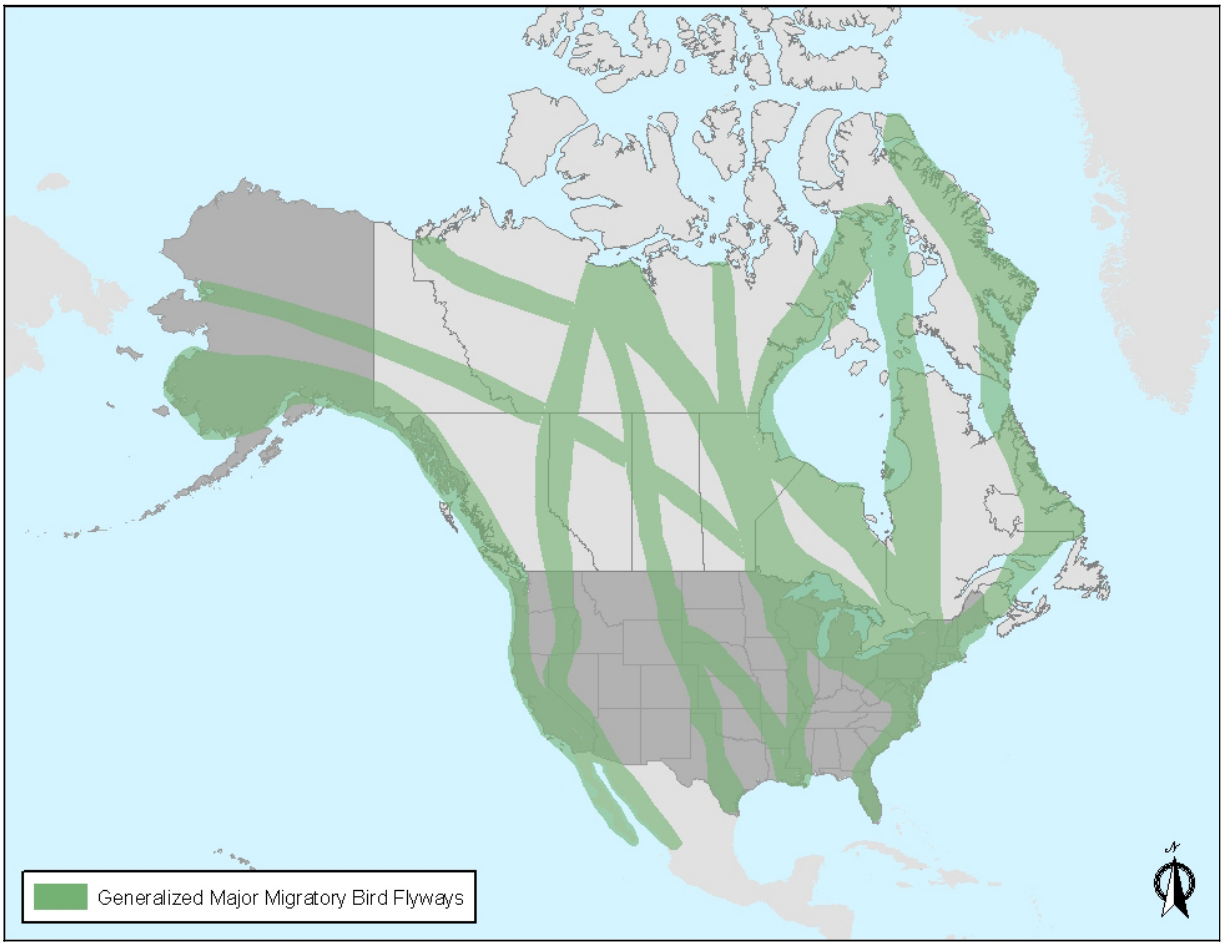

Figure 3-1. General Location of Migratory Bird Flyways in Continental North America

A second, more used line of travel for Atlantic coast migratory birds follows a direct route from Florida to South America. The route which is used almost entirely by landbirds, crosses over only two intermediate land masses between Florida and South America. Tens of thousands of birds of about 60 species cross the 150 miles from Florida to Cuba where many remain for the winter months. The others negotiate the 90 miles between Cuba and Jamaica. The route crosses more than 500 miles of open water from Jamaica to the coast of South America. In the fall, many of the birds breeding east of the Appalachian Mountains travel parallel to the Atlantic coast in a more or less southwesterly direction and then follow the same general direction from northwestern Florida across the Gulf of Mexico to the coastal regions of eastern Mexico (Lincoln et al. 1998).

The Atlantic coast wintering area receives waterfowl from three or four interior migration paths, one of which is of primary importance because it includes large flocks of canvasbacks, redheads, greater and lesser scaup, Canada geese, and many American black ducks that winter in the waters and wetlands in the coastal region south of Delaware Bay. The canvasbacks, redheads, and scaup come from breeding grounds on the great northern plains of central Canada. They follow the general southeasterly trend of the Great Lakes, then cross Pennsylvania over the mountains, and reach the Atlantic coast in the vicinity of the Delaware and Chesapeake Bays. American black ducks, mallards, and blue-winged teals gather in southern Ontario during the fall then leave these feeding grounds and proceed southwest. Many of the birds continue to follow a route down the Ohio Valley, but others swing abruptly to the southeast in vicinity of the St. Clair Flats between Michigan and Ontario, and cross the Appalachian Mountains before reaching the Atlantic coast south of New Jersey (Lincoln et al. 1998).

The Mississippi migration route extends from the Mackenzie Valley past the Great Lakes and down the Mississippi Valley. It is the longest migration route in the Western Hemisphere. Its northern terminus is on the arctic coast in the regions of Kotzebue Sound, Alaska, and the mouth of the Mackenzie River. The southern end of the route is in Argentina. The route is followed by vast numbers of ducks, geese, shorebirds, blackbirds, sparrows, warblers, and thrushes. Many of the species that follow the route spread out to the east and west towards their wintering areas after arriving at the Gulf coast. Others fly across the Gulf of Mexico and straight for Central and South America. This part of the flyway is characterized by a broad route extending from northwestern Florida to eastern Texas and southward across the Gulf of Mexico to Yucatan and the Isthmus of Tehuantepec. During the height of migration some of the islands off the coast of Louisiana are swarmed by large numbers of migrating birds (Lincoln et al. 1998)

The Central route, also referred to as the Great Plains-Rocky Mountain Route, also has its origin in the Mackenzie River Delta and Alaska. The route includes all of the region between the valley of the Mississippi River and the Rocky Mountains. Sandhill cranes, white-fronted geese, and smaller races of the Canada goose follow this route through the Great Plains from breeding areas in Alaska and western Canada. The route is used primarily by the northern pintails and American wigeons that fly southward through eastern Alberta to western Montana (Lincoln et al. 1998).

The Pacific coast route is not as long or heavily traveled as some of the other routes, because many species of birds that breed along the coast from the northwestern states to southeastern Alaska either do not migrate, or make relatively short journeys. The origin of the route is primarily in western Alaska, around the Yukon River Delta. Some of the scoters and other sea ducks of the north Pacific region and the cackling Canada goose of the Yukon River Delta use the coastal sea route for all or most of their southward flight. Large numbers of arctic-breeding shorebirds also use this route (Lincoln et al. 1998).

The Atlantic oceanic route, Pacific oceanic route, and the Arctic route are also followed by migratory birds that might pass through, or in close proximity to, the United States and its territories. The Atlantic route is primarily oceanic and passes directly over the Atlantic Ocean from Labrador and Nova Scotia to the Lesser Antilles, and then to the mainland of South America. Most of the adult American golden

plovers and some other shorebirds use this as their fall route. Strong fall movements of warblers travel from the New England coast out over the Atlantic to points south along the route. Some of the shorebirds that breed on the arctic tundra of the District of Mackenzie (Northwest Territories) and Alaska fly southeastward across Canada to the Atlantic coast and finally follow this oceanic route to the mainland of South America. Although most birds make their migratory flights either by day or by night, birds using this route fly both day and night (Lincoln et al. 1998).

The Pacific oceanic route is used by Pacific golden plovers, bristle-thighed curlews, ruddy turnstones, wandering tattlers, and other shorebirds. The ruddy turnstones, migrating from the islands in the Bering Sea, have an elliptical route that takes them southward through the islands of the central Pacific and northward along the Asiatic coast. In addition, many seabirds that breed in the far northern coasts as well as on southern coasts and islands migrate across the Pacific well away from land. Some of the birds probably migrate south through Asia to winter quarters in Japan, China, India, Australia, New Zealand, and the islands of Oceania. Others go south across the Pacific to Hawaii and other islands in the central and southern Pacific (Lincoln et al. 1998).

Many of the Arctic nesting birds travel only a short distance south in winter. These species include the red-legged kittiwake, Ross' gull, emperor goose, and eiders. The routes followed by these birds are chiefly parallel to the coast and can be considered tributary either to the Atlantic or Pacific coast routes. The best defined arctic route in North America follows the coast of Alaska (Lincoln et al. 1998).

Migratory birds, and birds in general, are discussed in more detail due to the potential for adverse effects on avian species associated with tower structures. Birds are potentially directly impacted by loss due to collision with towers or other birds concentrating in the vicinity of lighted towers, or indirectly due to disruption of flight associated with tower lighting. Thrushes, vireos, and warblers seem to be the most vulnerable to collisions with towers. These songbirds breed in North America in the spring and summer and migrate to the southern United States, the Caribbean, or Latin America during the fall and winter. They generally migrate at night and appear to be most susceptible to collisions with lit towers on foggy, misty, low-cloud-ceiling nights during their migrations (Manville 2000).

Many studies have been conducted to try to determine why avian impacts occur at towers, the overall impact of avian collisions, and how to best mitigate the impacts (URS 2004). Woodlot Alternatives, Inc. (Woodlot 2003) conducted a review of available journal studies addressing avian mortality at communication towers in response to a Notice of Inquiry issued by the FCC. Based on review of the studies, it was determined that most tower collisions involve neotropical migratory birds and occur during spring and fall when the birds are migrating. Most strikes occur during the fall migrations. Weather might be the most important factor in more concentrated collisions with the highest rates occurring on cloudy and foggy nights with a low cloud ceiling (Woodlot 2003). The higher rate of collision might be due to the effects of lighting on a bird's ability to accurately navigate. When low cloud ceiling or foggy conditions occur, tower lights refract off water particles in the air, creating an illuminated area around the tower. Migrating flocks of birds can lose stellar cues for nocturnal migration in these conditions. The birds that enter the lighted area around the tower are reluctant to leave. Mortality occurs when the birds hit the tower structure, guy wires, the ground, or each other, as more and more passing birds become trapped in the lighted space (URS 2004). Navigation appears to be generally uncomplicated on clear nights, but some collisions with towers still occur.

Tower height plays a role in avian mortality, but the exact height threshold for increased effects has not been determined. Studies indicate that towers shorter than 400 to 500 feet do not pose as much of a risk to migrating birds as the taller towers (Woodlot 2003). Most studies have monitored taller towers, so the potential level of impacts associated with shorter towers is not well-documented (URS 2004). Towers less than 200 feet in height would not require lighting unless they were within the takeoff or landing arcs

associated with airports. In addition, the shorter towers would not typically require guy wires for support. Elimination of the requirements for lighting or guy wires would be expected to reduce potential impacts on avian species associated with these tower features.

Threatened and Endangered Species. The ESA mandates that all Federal agencies consider the potential effects of their actions on listed threatened or endangered species or designated critical habitats. The USFWS currently lists 937 vertebrates, 192 invertebrates, 715 flowering plants, and 33 nonflowering plants as threatened or endangered in the United States and its territories. Species listed for coastal states range from 13 species listed in Alaska to 317 species listed in Hawaii. There are 75 federally listed species in Puerto Rico, and 62 associated with the remaining territories and outlying islands. In addition, the NMFS lists 46 species, or populations of species, within their jurisdiction as threatened or endangered. The USFWS has designated critical habitat for 475 of the listed species (USFWS 2006a).

Individual states and territories also provide protection to species considered to be threatened or endangered within their jurisdictions. State and territorially listed species typically include the federally listed species known to occur in the region and additional species considered to be sensitive within the jurisdiction.

Maritime, coastal, estuarine, and riverine ecosystems along with associated riparian and wetland systems have the potential to provide habitat, and in some cases critical habitat, for both Federal- and state-listed threatened or endangered species. Impacts on Federal- or state-listed species could occur in association with loss of habitat, or critical habitat associated with the placement of a new shore-based RF tower or access roads and utility lines, collision during construction, and, in the case of listed birds, collision with towers.

Wetlands. Determination of the presence of wetlands is based on procedures prescribed in the USACE Wetlands Delineation Manual (USACE 1987). Wetlands, as defined in the Federal manual are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions (USACE 1987). Three criteria are used to determine the occurrence of jurisdictional wetlands: (1) hydric soils, (2) wetland hydrology, and (3) hydrophytic vegetation.

The Cowardin wetland classification system, developed for the USFWS (Cowardin et al. 1979), uses a hierarchical approach to characterize wetlands. Wetland habitats are characterized based on Systems, Subsystems, Classes, and Subclasses. A wetland System is characterized by a complex of wetlands and deepwater habitats that share the influence of similar hydrologic, geomorphic, chemical, or biological factors (Cowardin et al. 1979). There are five Systems in the Cowardin classification scheme: Marine, Estuarine, Riverine, Lacustrine (lake), and Palustrine. The Marine and Estuarine Systems each have two Subsystems, Subtidal and Intertidal; the Riverine System has four Subsystems, Tidal, Lower Perennial, Upper Perennial, and Intermittent; the Lacustrine has two Subsystems, Littoral and Limnetic; and the Palustrine has no Subsystems. The wetland classes are based on substrate material and flooding regime, or on vegetative life form. For example the palustrine system includes all nontidal wetlands dominated by trees, shrubs, persistent emergent plants, or emergent mosses or lichens, and all wetlands that occur in tidal areas where the salinity is below 5 percent. The Subclasses further characterize the habitats based on the type and duration of flooding, water chemistry, soil or substrate characteristics, and other specific modifiers where appropriate.

It is not possible to describe in detail the type and extent of wetland habitats that could occur in the vicinity of an existing or proposed RF tower. Site-specific characterization of proposed project sites will be necessary to determine the potential for the occurrence of wetlands in proximity to a proposed or existing tower site. Site-specific characterization to determine the presence of wetlands will be addressed

in follow-on NEPA documentation, as necessary, during the siting of NAIS shore-based RF equipment when the USCG determines where such equipment would be located.

3.7 Cultural Resources

3.7.1 Definition of the Resource

Cultural resources can include archaeological sites, structures, districts, or any other physical evidence of human activity considered important to a culture, a subculture, or a community for scientific, traditional, religious, or any other reason. Depending on their condition and historic use, such resources can provide insight into living conditions of previous existing civilizations, or might retain cultural and religious significance to modern groups. Typically, cultural resources are subdivided into archaeological resources (prehistoric or historic sites where human activity has left physical evidence of that activity but no above-ground structures remain standing); architectural resources (buildings or other structures or groups of structures that are of historic or aesthetic significance); or resources of traditional, cultural, or religious significance to an American Indian tribe, or Native Hawaiian or Native Alaskan organization. Finally, traditional cultural properties (TCPs), as defined in National Register Bulletin 38, can include archaeological resources, structures, neighborhoods, prominent topographic features, habitats, or areas where particular plants, animals, or minerals exist that any cultural group considers to be essential for the preservation of traditional cultural practices.

NEPA instructs Federal agencies to assess the probable impacts of their actions on the "human environment" – defined as "the natural and physical environment and the relationship of people with that environment" (40 CFR 1508.1). Procedurally, Federal agencies conducting an analysis of impacts under NEPA must examine whether their actions are likely to have physical, visual, or other effects on

- Districts, sites, buildings, structures, and objects that are included in the National Register of Historic Places (NRHP), or a state or local register of historic places
- A building or structure that is more than 50 years old
- A neighborhood or commercial area that might be important in the history or cultural of the community
- A neighborhood, industrial, or rural area that might be eligible for listing in the NRHP as a historic district
- A known or probable cemetery, through physical alteration or by altering its visual, social, or other characteristics
- A rural landscape that might have cultural or aesthetic value
- A well-established rural community or rural land use
- A place of traditional cultural value in the eyes of a Native group (American Indian tribe or Native Hawaiian or Alaskan organization) or other community
- A known archaeological site, or land identified by archeologists as having high potential to contain archaeological resources
- An area identified by archeologists or through consultation with a Native group as having high potential to contain Native cultural items.

If a proposed action would have a significant adverse effect, the Federal agency is responsible for consulting with the State Historic Preservation Office (SHPO) or Tribal Historic Preservation Office (THPO), and other consulting parties, including Indian tribes and Native Hawaiian organizations, to

develop and evaluate alternatives or modifications to the undertaking that could avoid, minimize, or mitigate adverse effects on historic properties.

The National Historic Preservation Act of 1966, as amended (P.L. 102-575, 16 U.S.C. 470) (NHPA) directs Federal agencies to take a leadership role in the nation's preservation efforts, and to make informed decisions about the administration of federally owned or controlled historic properties. The NHPA created the Advisory Council on Historic Preservation (ACHP), which advises the President and Congress and reviews Federal and federally assisted actions affecting historic properties; provided for each state governor to designate a SHPO to participate in the Federal program; and established the NRHP to recognize historic properties important to the nation, the states, and local communities.

Section 110 lays out affirmative agency responsibilities with respect to historic properties under the agency's stewardship. These responsibilities must be balanced with the agency's mission. They include:

- Establishing a historic preservation program to include the identification, evaluation, and nomination or determination of eligibility of historic properties to the NRHP in consultation with the ACHP, SHPO, local governments, Native American tribes, and the interested public as appropriate.
- Prior to acquiring, constructing, or leasing buildings, agencies must use available historic properties to the maximum extent feasible.
- The agency must document historic properties that will be altered or destroyed as a result of agency actions; such actions must be reviewed in accordance with NHPA Section 106.
- In transferring historic properties, the agency must ensure that the significant historic values of the property are appropriately preserved.
- The head of the agency must document decisions to proceed with agency undertakings that adversely affect historic properties when the agency has been unable to reach agreement through the execution of a Memorandum of Agreement (MOA) or Programmatic Agreement (PA) with the ACHP and SHPO and desires to terminate such consultation.

The 1992 NHPA amendments added significant new provisions concerning Native American tribal participation in historic preservation. Specifically, Sec. 110(a)(2)(D) directs federal agencies' programs to ensure "that the agency's preservation-related activities are carried out in consultation with other Federal, State, and local agencies, Indian tribes, [and others] carrying out historic preservation planning activities."

Section 106 of the NHPA (16 U.S.C. 470f), as codified under 36 CFR Part 800, requires Federal agencies to consider the effects of their undertakings on historic properties prior to implementation. The regulations state that an undertaking does not have to be reviewed unless it is the "type of activity that has the potential to cause effects on historic properties" (36 CFR 800.3[a]). The NHPA defines "historic property" as any prehistoric or historic district, site, building, or structure included or eligible for inclusion in, the NRHP, including related artifacts, records, and material remains. Traditional, religious, and cultural properties holding significance for American Indian tribes, Alaska Native, and Native Hawaiian organizations may also be considered NRHP eligible.

In general, undertakings that have the potential to affect historic properties are those that involve modifications to land or buildings/structures, including everything from construction, grading, excavation, maintenance, rehabilitation, and renovation, to the sale or lease of a historic property.

The Section 106 process is designed to identify possible conflicts between historic preservation objectives and the proposed activity, and to resolve those conflicts in the public interest through consultation. The 1999–2000 revisions to the Section 106 regulations (36 CFR Part 800) discuss in detail the process that

agencies should follow to initiate the Section 106 review process. Specifically, once the Federal agency has determined that their undertaking is the type of action that has the potential to affect historic properties, the agency should

- Coordinate the Section 106 review with other review processes such as the NEPA review process
- Identify with which SHPO, THPO, federally recognized tribes or Native Hawaiian or Native Alaskan organizations they must consult (consultation with federally recognized tribes is not limited to projects undertaken on reservation lands, but includes projects that will occur on lands to which the tribe(s)/organizations have ancestral claims or treaty rights)
- Plan to involve the public
- Identify other consulting parties.

At the heart of the Section 106 review process is the assessment of effects on historic properties and avoidance or minimization of effects that are adverse. Although it is possible to make general statements regarding potential effects associated with the various alternatives discussed in this PEIS, the USCG will need to consult with the relevant SHPO and representatives of the appropriate federally recognized American Indian tribes or Native Hawaiian or Native Alaskan organizations with respect to the siting of specific shore-based locations. Depending upon the complexity of the issues involved, a Section 106 review can require a minimum of 30 days to get concurrence on a "no effect" determination from the SHPO to 6 to 12 months to negotiate a Memorandum of Agreement (MOA) and complete mitigation measures.

The Native American Graves Protection and Repatriation Act (NAGPRA) places affirmative duties on Federal agencies to protect, inventory, and rightfully dispose of Native American cultural items, both in existing collections and those that might be discovered in the future. The purpose of NAGPRA is to ensure the protection and rightful disposition of Native American cultural items found on Federal or Native American lands in the Federal government's possession or control. Section 2 of NAGPRA and 43 CFR Part 10, the implementing regulations, provide a detailed definition of cultural items regulated under the act. For the USCG, responsibilities under NAGPRA include to identify whether a facility has actual possession or control of existing collections of Native American cultural items, to determine what and where those items are, to determine if a planned activity will result in the excavation of cultural items, to notify tribal groups of proposed activities before issuing approvals or permits, and to develop procedures for the inadvertent discovery of cultural items. For the purposes of NAGPRA, "Native American" includes American Indian tribes and Native Hawaiian and Native Alaskan organizations. Repatriation of items to lineal Native American descendants (or to the tribe or organization with the closest cultural affiliation, if descendants cannot be determined) is regulated by 43 CFR 10.8 and 10.10.

The purpose of consultation under NAGPRA is to reach agreement as to the treatment and disposition of the specific kinds of "cultural items" defined in the act: Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony. The USCG is required to consult with the appropriate American Indian tribe, Native Hawaiian or Native Alaskan organization, or lineal descendant under four circumstances:

1. A summary of USCG holdings, dating from before the act, indicates that unassociated funerary objects, sacred objects, or objects of cultural patrimony are present.
2. An inventory of USCG holdings, dating from before the act, finds human remains or associated funerary objects.

3. The USCG is processing an application for a permit that would allow the excavation and removal of human remains and associated funerary objects from Federal lands.
4. Items covered by NAGPRA have been disturbed unintentionally.

Only the last two of these circumstances are relevant for this PEIS. Under NAGPRA, the USCG must consult with appropriate American Indian tribes, Native Hawaiian or Native Alaskan organizations, or individuals prior to authorizing the intentional removal of Native human remains and funerary objects found with them. The USCG must prepare documentation to show that consultation pursuant to Sec. 3(c) of NAGPRA has occurred; this documentation must be included and maintained in the decision record. A cultural resource use permit or equivalent documentation is generally required before human remains and artifacts covered by the act may be excavated or removed from Federal lands. Permit-related notification and consultation, if requested, are required by Section 4 of the Archaeological Resources Protection Act (ARPA) and 43 CFR 7.7. Consultation for NAGPRA purposes must occur before the excavation or removal of human remains and cultural items may be authorized.

Human remains or cultural items subject to NAGPRA discovered as a result of a USCG or USCG-authorized activity, such as the construction of new towers discussed in this PEIS, are to be handled in the manner described in the "inadvertent discovery" procedures found at Section 3 (d) of NAGPRA. Where there is a reasonable likelihood of encountering undetected cultural items during a proposed land use, agreements may be negotiated with tribes or groups before the project is authorized to provide general guidance on treatment of any cultural items that might be exposed. Having these agreements in place could save time and confusion during implementation.

It should be noted; however, that NAGPRA only applies to Federal lands. In the event that human remains or cultural items related to burials are inadvertently discovered during construction activities or, if there is a reasonable expectation that human remains or burial-associated cultural items may be present, the USCG should consult with potentially affiliated federally recognized Native American tribes in advance of the project, and should review state laws and regulations regarding unmarked burials or permits required for investigations in areas where there is potential for discovery of human remains, burial-associated cultural items, or archeological materials. Many states have such laws. Similarly, in the event that an archaeological investigation is warranted in advance of construction, the USCG should review the requirements of the Archaeological Resource Protection Act (ARPA) to obtain the appropriate permits for projects on Federal land, and the requirements of state regulations for permits to conduct investigations on state lands. In all instances, the archaeologist conducting the investigation should complete a review of previous investigations conducted in the vicinity of the proposed project area to ensure that sensitivity assessments or predictive models are sufficiently informed and detailed. All archaeological work should be conducted by an individual(s) meeting the National Park Service Professional Qualification Standards (48 Federal Register [FR[44716, September 1983).

3.7.2 Existing Conditions

Archaeological Resources. Archaeological resources in coastal and riverine settings can relate to pre-contact indigenous (American Indian, Native Hawaiian, or Native Alaskan) activity; European exploration and settlement; or post-contact settlement, warfare, and land use. Resource types can include habitation sites (e.g., ephemeral camps, base camps, villages, latte sets, palisaded villages, farmsteads), procurement sites (e.g., fish weirs and ponds, shellfish middens, wetland agricultural and aquaculture fields, bait cups, logging sites, and trading posts), manufacturing sites (e.g., kilns, mills, quarries), transportation sites (e.g., trail systems, landings, anchor holes), ceremonial sites (e.g., burial sites, shrines, petroglyphs, mounds, cemeteries), ruins of coastal and inland forts from the period of early European exploration and settlement; and battlefield sites and features associated with the Revolutionary and Civil

Wars. Archaeological resources can be present in a variety of habitats, including low and high dunes, sandy flats, beaches, intertidal zones, marshes/estuaries, coastal cliffs, floodplains, terraces, islands or bars within rivers, bars or spits along the coast, the shores of coastal islands, and along rocky and clay shorelines. Resources can also include deeply buried archaeological sites on river floodplains and lower terraces, or within dunes or estuaries near the coast; these sites have been progressively buried as wind and water circulation patterns change, river patterns change, or floods move large quantities of sediment to downstream locations. There could be no indications of these sites on the surface with discovery occurring during construction.

Construction of new towers in coastal areas, along inland waterways, or on the floodplains or terraces of major rivers has a high likelihood of impacting archaeological resources, as these areas were attractive locations for settlement throughout history. The archaeological potential of any given Area of Potential Effect (APE) will need to be determined through research and, if warranted, fieldwork. Research would primarily consist of reviewing information regarding previously recorded sites within or in the vicinity of the project area, reviewing the results of previous archaeological investigations conducted within or in the vicinity of the project area, including any archaeological sensitivity assessments or predictive models that may apply to the project area, and reviewing geological, soils, and geomorphological data for the APE to determine the potential for deeply buried site deposits. Fieldwork could include a walkover survey to document previous disturbance, pedestrian survey to identify surface artifact scatters, hand excavation of test pits, or mechanical excavation of trenches to identify deeply buried site deposits. As noted above, the USCG may need to obtain an ARPA permit for investigations conducted on non-USCG Federal lands, or state permits for investigations on non-Federal lands.

Historic Buildings and Structures. Historic buildings and structures on the coast and inland waterways could include private residences, hotels, commercial buildings, canneries, shipyards, coastal fortifications, piers, ports, wharves, power plants, seawalls, jetties, bridges, or causeways at the confluences of major rivers or between islands; locks and dams, lighthouses, and other navigation aids, some of which are protected by bulwarks or other barriers; historic districts (local, regional, or national); and National Historic Landmarks. Many of these types of resources are eligible for, or listed on, the NRHP and state registers of historic places. These resources are protected by both Federal and state laws.

Traditional Cultural Properties. The habitation patterns of Native peoples (American Indian tribes and Native Hawaiian and Native Alaskan organizations) have long focused on coastal areas and inland waterways. Native people used, and in some instances still use, the resources found there for a variety of traditional and sacred activities. Native peoples have relied on the inland waterways as transportation routes; water sources; sources of plants and animals for food, medicines, and raw materials (e.g., bird feathers, shells, turtle carapaces, reeds and water plants for basket weaving, clay for pottery); sources of cobbles used for tool making; and as cornerstones of oral traditions about their history. Most Native peoples are reluctant to identify such locations to outsiders, but resources of traditional, cultural, or religious significance to Native peoples are common throughout coastal areas and inland waterways and are likely to be encountered. The number of identified areas already is substantial—Hawaii alone has 20,000 to 30,000 known sites—and it would be a considerable effort to match proposed NAIS sites to known lists of such sites (USCG 1999).

TCPs can also include places or resources of traditional significance to other cultural groups, for example a town green area used for traditional gatherings by the local residents, or a neighborhood community center used by a specific ethnic group.

Construction of new towers in coastal areas, along inland waterways, or on the floodplains or terraces of major rivers has a high likelihood of impacting properties of traditional, cultural, or religious significance, as these areas were attractive locations for traditional and ceremonial use throughout history. The

presence/absence of properties of traditional, cultural, or religious significance will need to be determined through consultation with federally recognized American Indian tribes, or Native Hawaiian or Native Alaskan organizations. Such consultation needs to be initiated on a government-to-government basis by the USCG, as early as possible in the planning stage for any specific tower location. In the case of resources important to another ethnic group, the USCG should consult with the appropriate SHPO and local historic commission to determine the presence/absence and significance of any such resources within the project APE.

3.8 Visual Resources

3.8.1 Definition of the Resource

Visual resources are defined as the natural and man-made features that give a particular setting or area its aesthetic qualities. These features define the landscape character of an area and form the overall impression that an observer receives of that area. Evaluating the aesthetic qualities of an area is a subjective process because the value that an observer places on a specific feature varies depending on his/her perspective. For example, an engineer might appreciate the span of a bridge or causeway, while a geologist might appreciate the exposure of a particular sequence of strata in a road cut. In general, a feature observed within a landscape can be considered as "characteristic" (or character-defining) if it is inherent to the composition and function of the landscape. This is particularly true if the landscape or area in question is part of a scenic byway, a state or national scenic river, a state or national park, a state or national recreation area, a state or national landmark, a national seashore, or a cultural landscape. Landscapes do change over time, so the assessment of the environmental impacts of a proposed action on a given landscape or area must be made relative to the "characteristic" features currently comprising the landscape or area.

Visual resources within the coastal and inland waterway environment can include both man-made and natural features. In urban settings, man-made features dominate the landscape; while in rural settings, natural features dominate. Examples of natural visual resources that might occur along coastal areas and inland waterways would include landforms such as beaches, marshes, estuaries, wetlands, coastal cliffs, dunes, islands, water channels, spits, floodplains, terraces, tributary streams, channel islands, bars, cut-off loops in meander systems, deltas, beaver dams and bird nests, and native vegetation on those landforms. Within more urban settings, natural features might include parks and other green spaces, or waterfalls and ponds associated with milling operations. Examples of man-made features within dominantly natural landscapes might include farmsteads (houses and outbuildings), bridges, causeways, jetties, ports, wharves, piers, paths, lighthouses, canals, docks, and historic forts or fortifications (intact or in ruins).

Legal Authorities and Regulatory Programs

In addition to assessment of effects under NEPA, impacts on visual resources such as landscapes would need to be reviewed under Section 106 of the NHPA if the landscape is a cultural or historic landscape, or part of a National Historic Landmark. As noted in National Park Service Preservation Brief 36 "Protecting Cultural Landscapes," a cultural landscape is defined as "a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values." A historic landscape can include "residential gardens and community parks, scenic highways, rural communities, institutional grounds, cemeteries, battlefields and zoological gardens; and are composed of a number of character-defining features which, individually or collectively contribute to the landscape's physical appearance as they have evolved over time."

Similarly, visual impacts on battlefields would need to be assessed under the American Battlefield Protection Act of 1996 (P.L. 104-333; 16 U.S.C. 469k); visual impacts on scenic byways would need to be assessed under the National Scenic Byways Program (P.L. 105-178; 23 U.S.C. 162) and appropriate state laws regarding state-designated scenic byways; and visual impacts on scenic rivers would need to be assessed under the WSRA and appropriate state laws regarding state-designated scenic rivers. Impacts on the visual resources within state and national parks, including national seashores and national marine preserves, would need to be assessed in consultation with the National Park Service.

3.8.2 Existing Conditions

Mounting AIS equipment on existing buildings, bridges, or other structures could have an effect on visual resources if no such equipment was previously located on these structures. Addition of new equipment to an array of similar equipment already present within a landscape (collocation) would be unlikely to have an effect on visual resources on its own, but might have a cumulative effect.

It is not possible to describe in detail the entire affected environment of the broad geographic scope for visual resources as assessed in this PEIS. Construction of new towers in coastal areas, along inland waterways, or on the floodplains or terraces of major rivers has a high likelihood of impacting visual resources. Site-specific visual resources will be addressed in follow-on NEPA documentation, as necessary, during the siting of NAIS shore-based RF equipment as the USCG determines where such equipment would be located. Siting of new towers should be coordinated through public comment, and with state and Federal agencies, as appropriate, depending on the nature of the visual resource being impacted (e.g., coordination with National Park Service for national parks, national landmarks, cultural landscapes, national seashores).

3.9 Land Use

3.9.1 Definition of the Resource

The term "land use" refers to real property classifications that indicate either natural conditions or the types of human activity occurring or permitted on a parcel. In many cases, land use descriptions are codified in local zoning laws. There is, however, no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, "labels," and definitions vary among jurisdictions.

The main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. Compatibility among land uses fosters the societal interest of obtaining the highest and best uses of real property. Tools supporting land use planning include written master plans/management plans and zoning regulations. The Proposed Action and alternatives are evaluated for their potential to affect the project sites and adjacent land uses. The foremost factor affecting land use for the Proposed Action and alternatives is compliance with applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at project sites, the types of land uses on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its permanence as a change in land use.

General Land Use Categories. The following general land use categories have been identified as being potentially impacted through the proposed implementation of the NAIS project: agricultural lands, low-density residential and rural areas, medium- and high-density residential areas, commercial and industrial areas, military installations, and recreational areas. Land use categories of particular concern in this assessment include recreational areas, Coastal Zone Management (CZM) sensitive areas, and coastal

barriers. Due to the potential for impacts associated with tower structures they are assessed as separate subcategories.

Recreation. Recreational resources are both natural and human-made lands designated by Federal, state, and local planning entities to offer visitors and residents diverse opportunities to enjoy leisure activities. Recreational resources are those places or amenities set aside as parklands, beaches, trails (hiking, skiing, bicycling, equestrian), recreation fields, sport or recreational venues, open spaces, aesthetically pleasing landscapes, and a variety of other locales. National, state, and local jurisdictions typically have designated land areas with defined boundaries for recreation. Other less-structured activities—for example, hunting or cross-country skiing—are performed in broad, less-defined locales. A recreational setting might consist of natural or human-made landscapes and can vary in size from a roadside monument to a multimillion-acre wilderness area.

Coastal Zone Management. Coastal zones are areas along U.S. oceans and lakes that are regulated by state or local management plans developed under the authority of the CZMA. The CZMA was enacted in 1972 to encourage coastal states, Great Lake states, and U.S. territories and commonwealths to develop comprehensive programs to manage and balance competing uses of and impacts on coastal resources. Since 1974, with the approval of the first state CZM Program in Washington, 29 coastal states and 5 island territories have developed CZM programs. Together, these programs protect more than 99 percent of the nation's 95,331 miles of oceanic and Great Lakes coastline (NOAA 2006).

The National CZM program is a voluntary partnership between the Federal government and U.S. coastal states and U.S. territories authorized by the CZMA to

- Preserve, protect, develop, and, where possible, restore and enhance the resources of the nation's coastal zone for this and succeeding generations
- Encourage and assist the states to exercise effectively their responsibilities in the coastal zone to achieve wise use of land and water resources there, giving full consideration to ecological, cultural, historic, and aesthetic values, as well as the need for compatible economic development
- Encourage the preparation of special area management plans to provide increased specificity in protecting significant natural resources, reasonable coastal-dependent economic growth, improved protection of life and property in hazardous areas, and improved predictability in governmental decisionmaking
- Encourage the participation, cooperation, and coordination of the public, Federal, state, local, interstate, and regional agencies and governments affecting the coastal zone.

On January 5, 2006, NOAA published a final rule in the *Federal Register* revising certain sections of the CZMA Federal consistency regulations. Federal consistency is the CZMA requirement that Federal agency activities that have reasonably foreseeable effects on any land or water use or natural resource of the coastal zone (also referred to as coastal uses or resources and coastal effects) must be consistent to the maximum extent practicable with the enforceable policies of a coastal state's or territory's federally approved CZM program. Federal agency activities are activities and development projects performed by a Federal agency, or a contractor for the benefit of a Federal agency (NOAA 2006). In addition, USCG COMDTINST M16475.1D specifies that all USCG activities within or outside the coastal zone that affect any land or water use or natural resource within the coastal zone shall be carried out in a manner that is consistent to the maximum extent practicable with the enforceable policies of approved state and U.S. territory CZM programs.

Coastal Barriers. Coastal barriers are unique land forms that provide protection for diverse aquatic habitats and serve as the mainland's first line of defense against the impacts of severe coastal storms and

erosion. Located at the interface of land and sea, the dominant physical factors responsible for shaping coastal land forms are tidal range, wave energy, and sediment supply from rivers and older, pre-existing coastal sand bodies. Relative changes in local sea level also profoundly affect coastal barrier diversity (USFWS 2006b).

The Coastal Barrier Resources Act (CBRA) of 1982, (P.L. 97-348 96 Stat. 1653; 16 U.S.C. 3501 et seq.), established the John H. Chafee Coastal Barrier Resources System (CBRS), comprising undeveloped coastal barriers along the Atlantic, Gulf, and Great Lakes coasts. The law encourages the conservation of hurricane-prone, biologically rich coastal barriers by restricting Federal expenditures that encourage development, such as Federal flood insurance through the National Flood Insurance Program. Approximately 3.1 million acres of land and associated aquatic habitat are part of the CBRS (USFWS 2006b).

The USFWS maintains the repository for CBRA maps enacted by Congress that depict the CBRS, and advises Federal agencies, landowners, and Congress whether properties are a part of the CBRS and what kind of Federal expenditures are allowed in the CBRS. Federal monies can be spent within system units for certain exempted activities, after consultation with USFWS. Examples of such activities include emergency assistance, military activities essential to national security, exploration and extraction of energy resources, and maintenance of existing Federal navigational channels (USFWS 2006b).

3.9.2 Existing Conditions

General Land Use Categories. Cropland, grassland pasture, and range account for most of the land used for agricultural purposes, but land used for agricultural purposes also includes forest land used for grazing and land in farmsteads, farm roads, and farm lanes. Prime farmlands are discussed in **Section 3.4**.

Residential areas are defined by development density. Low-density residential areas would include rural residential areas where single family homes exist on larger lots. A medium- to high-density residential area would be defined by a medium to high ratio of dwellings per land area. A medium-density residential area might include a suburban neighborhood consisting predominantly of single-family homes on average-sized lots. High-density residential areas include areas with a large number of high density dwellings such as condos, apartment complexes, and single-family homes on small lots. Residential areas are normally highly sensitive to commercial and industrial uses that could be incompatible with residential uses.

Commercially zoned areas typically accommodate large lot developments for retail, businesses, industrial, or other mixed uses. Uses in commercial areas can be compatible with either residential or industrial uses, depending on the level of density and type of development. Similar to commercial areas, industrial areas accommodate large lots for businesses and can have light industrial uses which could include distribution to manufacturing. Typically, industrial areas are not compatible with residential uses.

Military installations in the United States include active-duty and reserve Army, Air Force, Navy, USCG, and Marine Corps installations.

Recreation. The types of recreation resources that could potentially be impacted by the Proposed Action would vary depending upon the specific site locations chosen for shore-based RF sites. Recreational resources include designated areas such as national and state parks, national and state recreation areas, national seashores, national monuments, national historic sites, state beaches, and state fishing areas. Other recreational resources potentially affected by construction and operation of the proposed RF sites are regional, county, and municipal parks; reservoirs and beaches; and recreation areas used by the local populace. Potential concerns in these areas include increases in traffic and noise, alteration of scenic

quality, increased access from the installation of new roadways, and conversion of land uses to nonrecreational uses, both individually and cumulatively.

Coastal Zone Management. A total of 34 coastal states and U.S. territories have developed CZM programs. Together, these programs protect more than 99 percent of the nation's 95,331 miles of oceanic and Great Lakes coastline (NOAA 2006). The likelihood is high that siting of NAIS shore-based RF equipment would be within designated CZM areas. In addition, although Federal lands are not considered part of the coastal zone, the consistency requirement applies to activities on Federal lands that have the potential to impact coastal zone resources outside those lands. The USCG will need to determine if each NAIS shore-based RF equipment site is within the jurisdiction of a state or U.S. territory CZM program, if necessary, as the USCG determines where such equipment would be located. Proper coordination with the applicable state or U.S. territory CZM program will occur at that time.

Coastal Barriers. Coastal barriers occur on all the coastlines of the United States. One of the longest and best-defined chains of coastal barriers in the world occurs along the United States shoreline bordering the Atlantic Ocean and the Gulf of Mexico. This chain contains more than 400 barriers and totals about 2,700 miles of shoreline. The coastal barriers from Maine to Texas show a high degree of regional diversity, controlled by differences in climate and in the physical processes shaping barrier shorelines. Long, continuous barriers with small ebb-tidal deltas are produced by longshore currents along wave-dominated coasts. These barriers are typified by the coastal barrier islands along the south Texas coast which are long, generally narrow, and cut by widely separated tidal inlets with large sand accumulations in the back-barrier bays, and small or nonexistent seaward shoals. Similar barrier islands are also found in parts of Louisiana, the Florida panhandle, southeast Florida, North Carolina's Outer Banks, the south shore of Long Island, and the Cape Cod segment of the Massachusetts coast. Tide-dominated coastlines support large ebb-tidal deltas. The Georgia coastal barrier islands typify a tide-dominated coastline; they are relatively short and stubby and are separated by stable tidal inlets with an average spacing of 9 miles. Tide-dominated barriers also occur in northeastern Florida, most of the South and North Carolina coasts, along the Delmarva Peninsula, Massachusetts, and in some areas of Louisiana and Texas (USFWS 2006b).

The likelihood exists that siting of NAIS shore-based RF equipment would be within the CBRS. Although CBRA prohibits most Federal spending in designated CBRS units, the construction, operation, maintenance, and rehabilitation of USCG facilities is exempt from this provision under 16 U.S.C. 3505. This exempted status is not applicable to the acquisition of land within the CBRS. Once the USCG determines where the proposed NAIS shore-based RF equipment sites would be located, proper coordination with the USFWS will be conducted, as necessary, to determine if the sites are within CBRS units and to take the necessary actions to comply with the CBRA.

3.10 Infrastructure

3.10.1 Definition of the Resource

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly human-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as "urban" or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to economic growth of an area. The infrastructure components to be discussed in this section include utilities (electricity and communications), solid waste, and the transportation network.

The presence or absence of required infrastructure is an important consideration in selecting sites for renovation or new construction. Having to construct, initiate, or contract such work to support site

operations can greatly impact estimated project costs. With respect to utilities, sites would generally fall into two categories: those in a developed setting (e.g., urban areas, developed suburban areas, and Federal installations) and those in an undeveloped setting (e.g., rural and remote areas).

Solid waste management services are available in nearly all developed areas within the continental United States; however, these services might not be readily available in undeveloped settings. Solid waste management is by Subtitle D of the Resource Conservation and Recovery Act (RCRA), as implemented by requirements specified in 40 CFR Parts 240 through 244, 257, and 258; and other applicable Federal regulations. In general, these regulations establish procedures for the handling, storage, collection, and disposal of solid waste; recordkeeping and reporting; and pollution prevention.

3.10.2 Existing Conditions

It is not possible to describe in detail the entire affected environment for infrastructure considering the broad geographic scope assessed in this PEIS. Site-specific infrastructure will be addressed in follow-on NEPA documentation, as necessary, during the siting of NAIS shore-based RF equipment as the USCG determines where such equipment would be located. A discussion of various elements of infrastructure that would be considered in siting NAIS shore-based RF equipment follows.

Utilities. Sites chosen in developed settings would have higher accessibility to utilities than undeveloped settings. Utilities in undeveloped settings might not exist, or might be far from the project site. Electricity and communications would be the only utilities required to operate the shore-based RF sites.

Solid Waste. Normal operation of each NAIS shore-based RF site does not require municipal solid waste collection and disposal services; however, during construction a small amount of construction and demolition (C&D) waste would be generated. C&D waste generated from specific construction, renovation, and maintenance projects associated with the Proposed Action would be the responsibility of the contractor doing the work. Contractors are required to comply with Federal, state, local, and USCG regulations for the collection and disposal of solid wastes. Some of this material can be recycled or reused, or otherwise diverted from landfills. All nonrecyclable C&D waste is collected in a dumpster until removal. C&D waste contaminated with hazardous waste, asbestos-containing material (ACM), lead-based paint (LBP), or other undesirable components is managed in accordance with Commandant Instructions Manual (CIM) 16478.1B, *Hazardous Waste Management Manual*.

Transportation Network. Since the locations of NAIS shore-based RF sites are not known at this time, the availability of transportation networks and access from such networks to the NAIS shore-based RF sites would vary widely. If a site is located in a developed setting, then transportation networks and access to the sites might be readily available; however, transportation networks or access in undeveloped settings might not exist, or might be located far from the project site. In some cases, future proposed NAIS shore-based RF sites might require easements or other rights of access over private, local, county, state, or Federal property.

3.11 Hazardous Substances

3.11.1 Definition of the Resource

Hazardous material is defined as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that could cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. In addition to being a threat to humans, the improper release of hazardous materials and wastes can threaten the health and well being of wildlife species, botanical habitats, soil systems, and

water resources. Hazardous waste is defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that pose a substantial present or potential hazard to human health or the environment. In the event of release of hazardous materials or wastes, the extent of contamination varies based on type of soil, topography, and water resources.

Special hazards are those substances that might pose a risk to human health, but are not regulated as contaminants under the hazardous waste statutes. Included in this category are ACM, radon, LBP, and polychlorinated biphenyls (PCBs). The presence of special hazards or controls over them might affect, or be affected by, a proposed action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a proposed action.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and Toxic Substances Control Act (TSCA), define hazardous materials. The Solid Waste Disposal Act, as amended by RCRA, which was further amended by Hazardous and Solid Waste Amendment (HSWA), defines hazardous wastes. In general, both hazardous materials and wastes include substances that, because of their quantity; concentration; or physical, chemical, or infectious characteristics, could present substantial danger to public health or welfare or the environment should they be released or otherwise improperly managed.

3.11.2 Existing Conditions

Hazardous Materials and Waste. CIM 16478.1B, *Hazardous Waste Management Manual*, establishes policies and prescribes responsibilities and procedures for USCG compliance with RCRA and associated regulations found in 40 CFR 260–281, 40 CFR 122–124, and 49 CFR 171–177. It applies to all USCG personnel who authorize, procure, issue, use, or dispose of hazardous materials, and to those who manage, monitor, or track any of those activities. This manual also ensures proper management and disposal of hazardous wastes generated by USCG facilities. In addition, the responsibilities of conditionally exempt, small- and large-quantity generators are addressed in detail.

Asbestos-Containing Materials. CIM 16478.1B and CIM 6260.16A, *Asbestos Exposure Control Manual,* provides the direction for asbestos management at USCG facilities. These instructions incorporate by reference applicable requirements of 29 CFR Part 669 et seq., 29 CFR 1910.1025, 29 CFR 1926.58, 40 CFR 61.3.80, Section 112 of the CAA, and other applicable CIMs and DOD Directives. Asbestos is regulated by USEPA with the authority promulgated under the Occupational Safety and Health Administration (OSHA), 29 U.S.C. 669, et seq. Section 112 of the CAA regulates emissions of asbestos fibers to ambient air. USEPA policy is to leave asbestos in place if disturbance or removal could pose a health threat.

Building materials in older buildings are assumed to contain asbestos. It exists in a variety of forms and can be found in floor tiles, floor tile mastic, roofing materials, joint compound used between two pieces of wallboard, some wallboard thermal system insulation, and boiler gaskets. If asbestos is disturbed, fibers can become friable. Common sense measures, such as avoiding damage to walls, will keep the fibers from becoming airborne and hazardous. The ACMs are removed in conjunction with other building renovation and alteration projects.

Lead-Based Paint. The Residential Lead-Based Paint Hazard Reduction Act of 1992, Subtitle B, Section 408 (commonly called Title X), passed by Congress on October 28, 1992, regulates the use and disposal of LBP on Federal facilities. Federal agencies are required to comply with applicable Federal, state, and local laws relating to LBP activities and hazards. CIM 16478.1B provides the direction for lead and other metal-based paint management at USCG facilities. This policy incorporates by reference the requirements of 29 CFR 1910.120, 29 CFR Part 1926, 40 CFR 50.12, 40 CFR Parts 240 through 280, the

CAA, and other applicable Federal regulations. In addition, the policy requires USCG facilities to identify, evaluate, manage, and abate LBP hazards.

3.12 Socioeconomics and Environmental Justice

3.12.1 Definition of the Resource

Socioeconomics. Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly characteristics of population and economic activity. Regional birth and death rates and immigration and emigration affect population levels. Economic activity typically encompasses employment, personal income, and industrial or commercial growth. Changes in these two fundamental socioeconomic indicators are typically accompanied by changes in other components, such as housing availability and the provision of public services. Socioeconomic data at county, state, and national levels permit characterization of baseline conditions in the context of regional, state, and national trends.

Data in three areas provide key insights into socioeconomic conditions that might be affected by a proposed action. Data on employment identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on personal income in a region can be used to compare the "before" and "after" effects of any jobs created or lost as a result of a proposed action or alternatives. Data on industrial or commercial growth or growth in other sectors provide baseline and trend line information about the economic health of a region.

In appropriate cases, data on expenditures associated with a proposed action in the regional economy help to identify the relative importance of a proposed action in terms of its purchasing power and jobs base.

Demographics identify the population levels and changes to population levels of a region. Demographics data might also be obtained to identify, as appropriate to the evaluation of a proposed action, a region's characteristics in terms of race, ethnicity, poverty status, educational attainment level, and other broad indicators.

Environmental Justice. There are no Federal regulations on socioeconomics, but there is an EO that pertains specifically to environmental justice issues. On February 11, 1994, President Clinton issued EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. This EO requires Federal agencies to identify and address, "as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities, in minority populations and low-income populations…" COMDTINST 5810.3, *Coast Guard Environmental Justice Strategy*, directs the USCG to "conduct its programs, policies and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under, such programs, policies, and activities, because of their race, color or national origin."

3.12.2 Existing Conditions

It is not possible to describe in detail the entire affected environment considering the broad geographic scope being assessed in this PEIS. Site-specific socioeconomic impacts will be addressed in follow-on NEPA documentation, as necessary, during the siting of NAIS shore-based RF equipment. However, the USCG assumes that total construction costs for collocated sites would range from approximately

$190,000 to $345,000 per site in 2006 dollars. The USCG also assumes that new site construction would cost approximately $805,000 per site in 2006 dollars.

To aid in the evaluation of this resource area, general categories are described to help define and weigh effects on socioeconomics and environmental justice. These categories include low-income areas, medium- to high-density residential areas, rural areas, and areas with a high percentage of minorities.

Low-income areas would be defined as areas where the majority of individuals live below the poverty level. In 2004 (latest data available), the poverty threshold for a family of four with two children was $19,157 (U.S. Census Bureau 2005). Medium- to high-density residential areas would be defined as areas with high clusters of single-family homes. For the purpose of this PEIS, rural areas will be defined as areas with fewer than 2,500 people as defined in the 1990 Census (U.S. Census Bureau 1995). An area would be considered to have a high percentage of minority individuals if the percentage of minorities was more than 50 percent or was appreciably higher than the county or municipal average.

The potential for effects concerning environmental justice is based on specific demographic data of an area. The potential for the Proposed Action or alternatives to have impacts on demographics characteristics would be based on the significance criteria on a site-by-site basis.

3.13 Human Health and Safety

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Human health and safety addresses (1) workers' health and safety and public safety during demolition activities and facilities construction, and during subsequent operations of those facilities; and (2) potential human exposure to RF radiation.

Construction-site safety is largely a matter of adherence to regulatory requirements imposed for the benefit of employees and implementation of operational practices that reduce risks of illness, injury, death, and property damage. The health and safety of onsite military and civilian workers are safeguarded by numerous regulations designed to comply with standards issued by OSHA and USEPA. These standards specify the amount and type of training required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits for workplace stressors.

Safety and accident hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation, maintenance and repair activities, and the creation of highly noisy environments. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation process creates unsafe environments for nearby populations. Extremely noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

RF radiation (i.e., radio waves) can be defined as a broad spectrum of electromagnetic waves generated by oscillation of a charged particle with wave frequency (the number of sound waves per unit time) in the RF range, which is usually between 10 kilohertz (kHz) and 300,000 megahertz (MHz) (DHS 2005). In the United States the FCC authorizes or licenses most RF telecommunications services, facilities, and devices used by the public, industry, and state and local governmental organizations.

Probably the most important use for RF energy is in providing telecommunications services to the public, industry, and government. Radio and television broadcasting, cellular telephones, personal

communications services (PCS), pagers, cordless telephones, business radio, radio communications for police and fire departments, amateur radio, microwave point-to-point radio links, and satellite communications are just a few of the many applications of RF energy for telecommunications. For comparison purposes, a handheld cellular phone broadcasts at 0.6 watt at a frequency of 824 to 849 MHz, a citizen band (CB) radio broadcasts at 4 watts on frequencies from 26.96 to 27.41 MHz, and a large urban FM radio station can broadcast at up to 50,000 watts on frequencies ranging from 88 to 108 MHz (DHS 2005). Although RF radiation does not present as great a health hazard as "ionizing" radiation sources (which can cause molecular changes that could result in significant genetic damage) such as X-rays and gamma rays, high intensities of RF radiation can be harmful. Similar to microwaves, RF radiation has the ability to heat biological tissue rapidly, resulting in tissue damage, which is known as a "thermal" effect. The extent of this heating depends on several factors, the most limiting of which is radiation frequency. Others include the size, shape, and orientation of the exposed object; duration of exposure; environmental conditions; and efficiency of heat dissipation (FCC 1999).

Studies have shown that environmental levels of RF energy routinely encountered by the general public are generally far below levels necessary to produce significant heating and increased body temperature (DHS 2005). However, there might be situations, particularly workplace environments near high-powered RF sources, where recommended limits for safe exposure of human beings to RF energy could be exceeded. In such cases, restrictive measures or actions could be necessary to ensure the safe use of RF energy.

At relatively low levels of exposure to RF radiation, the evidence for resulting harmful biological effects is unproven (FCC 1999). However, there are multiple sources of information that list maximum permissible exposure, also known as permissible exposure limits (PEL), for RF radiation. The FCC adopted guidelines for RF radiation in 1996, which were developed by the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers, Inc. (IEEE) in 1992. These exposure criteria identify the threshold level at which harmful biological effects could occur based on electric and magnetic field strength and power density. FCC guidelines are most stringent for the frequency range from 30 to 300 MHz, the range in which the human body absorbs RF radiation most efficiently. PELs are placed in two categories. The first category, the occupational population, applies to human exposure to RF fields when a person is exposed due to their employment, has been made fully aware of the potential for exposure, and can exercise control over their exposure (DHS 2005). The second category, the general population, applies to human exposure to RF fields when the general public might be exposed or when personnel exposed because of their employment might not be aware of exposure or cannot exercise control over the exposure (DHS 2005). A significant impact would occur if exposure limits to the occupational or general population exceeded the maximum PEL. Operating power is a major factor in determining exposure limits. Commercial radio and television stations operate in a range from a few hundred watts up to millions of watts. The FCC only requires that tower-mounted installation be evaluated if antennas are mounted lower than 10 meters above the ground and the total power of all channels being used is more than 1,000 watts of effective radiated power. The proposed operating power of the radio transmitters at an NAIS site would be a maximum of 50 watts, with frequencies ranging from approximately 156 to 414 MHz. Based on this operating power, it is reasonable to assume that the potential for harmful exposure to RF radiation would be extremely low.

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